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**RETICLE MANIPULATORS AND RELATED METHODS FOR CONVEYING
THIN, CIRCULAR RETICLES AS USED IN CHARGED-PARTICLE-BEAM
MICROLITHOGRAPHY**

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Abstract of the disclosure

Robotic reticle manipulators are disclosed for use in holding and conveying, with good stability, thin, circular reticles as used in charged-particle-beam (*e.g.*, electron-beam) microlithography. An embodiment of such a manipulator includes at least one arm configured for executing movements in the X-, Y-, and Z-directions.

- 10 Connected to the distal end of the at least one arm is a U-shaped fork (as an exemplary reticle-support member) defining recessed surfaces and vacuum ports for holding the reticle at the reticle's narrow handling zone located along the periphery of the reticle. Each vacuum port includes an upwardly extending lip that defines, on its "upward"-
- 15 facing surface, a respective reticle-contact surface. Three such vacuum ports are provided on the fork and are situated so as to be nearly equidistantly separated from one another. Thus, as the reticle is being held and conveyed by the manipulator, the reticle is securely held to prevent reticle damage.